

ELECTRONIC DEVICES AND METHODS FOR MAKING SAME USING NANOTUBE REGIONS TO ASSIST IN THERMAL HEAT-SINKING

Abstract

A semiconductor device die (10, 116) is disposed on a heat-sinking support structure (30, 100). Nanotube regions (52, 120) contain nanotubes (54, 126) are arranged on a surface of or in the heatsinking support structure (30, 100). The nanotube regions (52, 120) are arranged to contribute to heat transfer from the semiconductor device die (10, 116) to the heat-sinking support structure (30, 100). In one embodiment, the semiconductor device die (10) includes die electrodes (20, 22), and the support structure (30) includes contact pads (40, 42) defined by at least some of the nanotube regions (52). The contact pads (40, 42) electrically and mechanically contact the die electrodes (20, 22). In another embodiment, the heat-sinking support structure (100) includes microchannels (120) arranged laterally in the support structure (100). At least some of the nanotube regions are disposed inside the microchannels (100).